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Contribution of thermal analysis and kinetics of Siberian and Tatarstan regions crude oils for in situ combustion process

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Abstract

© 2015 Akadémiai Kiadó, Budapest, Hungary. This research focused on the characterization and kinetics of Siberian and Tatarstan crude oils by gas chromatography, combustion calorimetry, and thermogravimetry (TG-DTG) techniques. Calorimetric experiments show that crude oil with higher saturate content and low resin fraction has higher heating value. TG-DTG curves indicates that the crude oils undergoes two major transitions when subjected to an oxidizing and constant rate environment known as low- and high-temperature oxidations at each heating rate studied. Kinetic analysis in the low- and high-temperature oxidation regions was performed using model-free methods knows as Ozawa-Flynn-Wall and Kissinger-Akahira-Sunose. Throughout the study, it was observed that the activation energy values of the crude oil samples are varied between 41-72 and 145-198 kJ mol-1 in low- and high-temperature oxidation regions, respectively.

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Keywords

Calorimetry, Crude oil, In situ combustion, Kinetics, TG, Thermal analysis